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Glutathione-s-transferase is a minor allergen in birch pollen because of restricted release from hydrated pollen grains

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Background

Recently, proteomic profiling of birch pollen detected a protein homologous to glutathione-S-transferases (GST) in prominent amounts. In mites, cockroach and fungi, GST are relevant allergens. This tempted us to investigate the allergenicity of GST from birch (bGST).

Methods

bGST was expressed in Escherichia coli, purified and characterized by mass spectrometry. BALB/c mice were immunized with bGST or Bet v 1. Antibody and T cell responses were assessed. 217 sera from birch pollen-allergic patients were tested for IgE-reactivity to bGST by ELISA. The allergenicity of bGST was evaluated with IgE-loaded rat basophil leukaemia cells (RBL) expressing the α-chain of the human receptor FcεRI. Cross-reactivity of IgE between bGST and GST from house dust mite, Der p 8, was assessed with murine and human sera in ELISA. The release kinetics of bGST and Bet v 1 from birch pollen upon hydration were studied by immunoblotting.

Results

Immunization with bGST induced specific IgE and a Th2-dominated cellular immune response comparably to immunization with Bet v 1. Only 13.4% of birch pollen-allergic patients were sensitized to bGST. In RBL assays bGST induced mediator release. GST from birch and house dust mites did not cross-react. In contrast to Bet v 1, bGST showed a limited and delayed release from hydrated birch pollen grains.

Conclusion

bGST induces specific IgE in mice but is of limited sensitizing capacity for humans. In contrast to Bet v 1, the release of bGST from hydrated pollen is restricted. Thus, the minor allergenicity of bGST may be explained by a limited exposure of patients to this protein.

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